CYBER INFRASTRUCTURE RESOURCES
FOR MASON RESEARCHERS

Mason's **Office of Research Computing (ORC)** coordinates and supports the computing-related needs of the university's research community. Unless otherwise indicated services are offered free of charge. Below is a list of key services and resources the ORC offers:

HIGH PERFORMANCE COMPUTING (HPC) CLUSTERS

HOPPER Cluster: *named in honor of Admiral Grace Hopper.*

- 4 login/head nodes
- 74 compute nodes each with 2 Intel (Skylake) processors, 48 cores, 192GB RAM
- 90 compute nodes each with 2 AMD (Milan) processors, 64 cores or 128 cores, and 256GB-4TB RAM
- 2 DGX GPU nodes each with 2 AMD (Rome) processors, 128 cores, and 8 NVidia A100 (40GB) GPUs, 1TB RAM, 14TB flash storage
- 24 GPU nodes each with 2 AMD (Milan) processors, 64 cores, 512GB RAM, and 4 NVidia A100 (80GB) GPUs
- 2 high speed networking fabrics:
    - a redundant 25Gb/s Ethernet network and
    - a 100Gb/s HDR InfiniBand network
- Open OnDemand -- Interactive web-based GUI computing including Jupyter Notebook, MATLAB, RStudio, Mathematica, STATA

The cluster runs on the Linux operating system. It has access to:

- a fast all-flash scratch storage for home, projects and scratch directories, and
- a hybrid flash+disk storage for general workloads.

TRAINING/WORKSHOPS/CONSULTING:

- Carpentry workshops on Bash Shell, GitHub, Python, R, etc.
- Come talk to us about using local, national, and commercial cloud resources for research

VIRTUAL COMPUTING

An Openstack cluster with 7 AMD (Milan) GPU nodes will be available August 2023. A total of 21 NVidia A40 (48GB) GPUs will provide capacity for up to 80 concurrent CPU enable Linux Virtual Desktop Instances (VDIs) for visualization, rendering, or GPU compute workloads. Non-GPU desktop Linux VMs will also be available. Desktop instances will be accessible via a simple self-service web interface

DATA SERVICES

Storage:
- An all-flash storage system for demanding HPC workloads
- "MEMORI2" - a hybrid flash+disk storage for general workloads
- The storage systems provide:
    - High resilience and redundancy storage for research data
    - Storage is priced on a cost recovery basis. Pricing is $50/TB/year and is sold in units of 1TB
    - Data backup available upon request and additional cost
    - File transfers over SSH/SFTP/Globus

Sharing:
- Data can be shared within internal groups in the HPC cluster.
- Data can be share with external collaborators using Globus.
- Some volumes can be mounted on local computers when on GMU network space.
- If you only need storage/backup, then SharePoint or OneDrive may be cost-free options

Sensitive Data:

If your research data meets any of these conditions:

- classified as Controlled Unclassified Information (CUI) or Sensitive
- has access restrictions placed by the data providers
- requires additional security measures

then ORC is available to consult on how to meet your data restrictions.

Other Data-related Resources:
- GitLab
    - A web-based Git Repository manager which can be used for sharing both within Mason and with external collaborators
- Globus
    - 2 Data Transfer Nodes (DTNs) providing fault-tolerant transfer, sharing, and/or publishing of data via GMU-DTN1.ORC and GMU-DTN2.ORC
- Survey Tools:
    - RedCap
    - Qualtrics

GEORGE MASON UNIVERSITY

OFFICE OF RESEARCH COMPUTING

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